Lake Champlain Basin Program

Federal Actions and Opportunities

Activities of Federal Agencies in Partnership to Protect Lake Champlain

For more information about the agencies and activities listed in this report, or for contact information for the LCBP Federal Agencies Working Group, contact:

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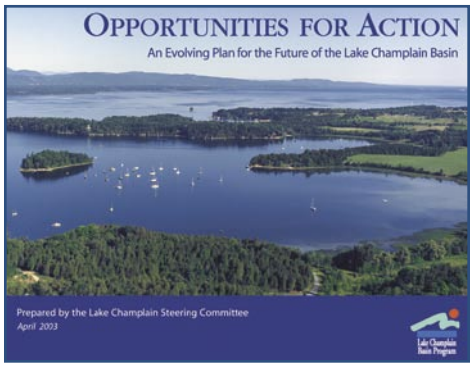
Overarching Federal Agency Support by the Environmental Protection Agency

The Environmental Protection Agency (EPA) is responsible for core administrative and technical support affecting all of the Lake Champlain Basin Program (LCBP). EPA provides funding through its annual appropriation to support activities identified by the Lake Champlain Steering Committee. This funding supports coordination of activities implementing the Lake Champlain Management Plan, *Opportunities for Action* throughout the Lake Champlain basin, including the work of two countries, one province, two states, and several state, provincial, and Federal agencies. These initiatives fall into the following categories: reducing phosphorus pollution; preventing pollution from toxic substances; protecting human health; managing fish and wildlife; protecting and restoring wetlands, streams and riparian habitats; managing nonnative aquatic nuisance plants and animals; managing recreation resources; informing and involving the public; building local-level implementation; measuring and monitoring success; and economics in the Lake Champlain Basin.

Many other Federal agencies also work to implement *Opportunities for Action*. To facilitate their mutual cooperation, several agencies established a Federal workgroup and signed a *Memorandum of Understanding* regarding their work to implement the management plan. This document summarizes the recent plan implementation efforts of each participating agency.



View the plan online at www.lcbp.org.

Reducing Phosphorus Pollution

Reduce phosphorus inputs to Lake Champlain to promote a healthy and diverse ecosystem and provide for sustainable human use and enjoyment of the Lake.

KEY FEDERAL ACTIONS

Environmental Protection Agency

EPA provides funding for TMDL (Total Maximum Daily Load) development, the Clean Water Act Section 319 (non-point source) program, state water-quality standards development, the Clean Water State Revolving Fund (SRF) programs, and special projects as funded by Congress. These programs are implemented through the Vermont Agency of Natural Resources (VT ANR) and the New York Department of Environmental Conservation. Funding is provided for upgrading wastewater treatment facilities throughout the Lake Champlain Basin to reduce phosphorus from point sources. Interested parties can contact these agencies for the availability of funds. Loans have been awarded through the SRF in New York and Vermont.

Additionally, EPA is funding several initiatives to control stormwater and septic system pollution. For example, in the Potash Brook watershed, EPA is funding a grant that will demonstrate innovative stormwater and stream stabilization practices. Work in this small watershed will involve several partners, including the City of South Burlington, the VT ANR, and the University of Vermont (UVM), and will include a public education component. EPA is also funding stormwater research by the University of Vermont that will result in stormwater management tools for individuals, developers, municipalities and policy makers. EPA is funding another stormwater project in Chittenden County, as well as an onsite wastewater demonstration project.

Natural Resources Conservation Service

The Farmland and Ranchland Protection Program provided $7,381,270 (matched with state dollars) in fiscal year (FY) 2004 for conservation of 23,198 acres of farmland located in the Lake Champlain Basin. The funding was used for 95 projects to purchase development rights to ensure that the land will stay in farming use instead of residential development. Since urban built-up land contributes more non-point phosphorous pollutants than does agricultural land, this program will help to avoid increases in phosphorous loading to the Lake.

BOB SYLVESTER/NRCS

NRCS built this waste storage pond at Foster Brothers Farm in Middlebury, Vermont to collect phosphorus runoff from compost.

The Environmental Quality Incentives Program (EQIP) provides financial and technical assistance to agricultural producers to address natural resource concerns. In 2004, Natural Resources Conservation Service (NRCS) provided $4,564,410 in funding for these programs in the Lake Champlain Basin. Higher priority was given to impaired waters, and $2,015,400 or 44 % of the total funding for the Basin was allocated to the Missisquoi and St. Albans Bay watersheds. Much of the money was allocated for animal waste management practices such as manure storage and nutrient management. In the past year there were 42 conservation nutrient management plans proposed.

The Conservation Reserve Enhancement Program (CREP) is administered by the U.S. Department of Agriculture (USDA) Farm

Service Agency and the Vermont Agency of Agriculture, with technical assistance provided by NRCS. This program, funded at approximately $900,000 from USDA and $600,000 from the State of Vermont, has resulted in nearly 1,000 acres of new riparian buffers in the Lake Champlain Basin, reducing edge-of-field delivery of pollutants to water bodies.

In the past four years, NRCS has received Congressional earmarks to assist producers in piloting new alternative technologies to address animal waste issues. In FY 2004, NRCS entered into an agreement with Poultney/Mettowee Natural Resources Conservation District (NRCD) for $275,000 to demonstrate new manure management technologies.

NRCS provided technical assistance to the Winooski NRCD in implementation of an EPA-funded Clean Water 104(b) work plan for Implementing Urban Stormwater Management Practices in the Potash and Allen Brook watersheds. NRCS also participated in the Vermont Water Resources Board docket: *Investigation into Developing Cleanup Plans for Stormwater Impaired Watersheds* and in the Vermont Department of Environmental Conservation (DEC) Stormwater Advisory Group.

USGS

Streamflow measurement at Englesby Brook in Burlington, Vermont.

U.S. Geological Survey

The U.S. Geological Survey (USGS) is conducting a long-term (1999-2007) study of the efficacy of agricultural and urban best management practices (BMPs) in reducing phosphorus and sediment loads to Lake Champlain. The agricultural study is investigating changes in water-quality conditions resulting from implementation of a number of BMPs at a farm site in the Little Otter Creek watershed in Ferrisburg, Vermont. Agricultural BMPs at this site are being funded through NRCS. The urban study is investigating changes in water-quality conditions on Englesby Brook in Burlington, where the City of Burlington is utilizing funding from the Pine Street Barge Canal Superfund settlement to implement a number of urban BMPs. Water-quality sampling is conducted monthly and during storm events. Total funding for the project is estimated at $950,000, with FY 2004 funding at $139,000.

The USGS operates a network of 37 streamflow, lake, and reservoir gaging stations in the Lake Champlain Basin. Three lake gages and 17 tributary streamflow stations directly support water-quality studies in the Lake Champlain Basin. In FY 2004, a new gage was established on Potash Brook to support stormwater management programs by the City of South Burlington and the Vermont Agency of Transportation. An additional gaging station is planned for installation on Allen Brook in the near future. Real-time data from this network also support flood forecasting, warning, and recreational uses. Long-term data from the network provide for improved knowledge of basin hydrology and streamflow characteristics needed for design and management decisions and flood hazard mitigation. USGS funding for the basin-wide network is $293,000 in FY 2004.

National Oceanic and Atmospheric Administration

With funding from the National Oceanic and Atmospheric Administration (NOAA), the Lake Champlain Sea Grant research initiative is providing urban watershed pollution prevention, reduction, and education activities to assist residents, local officials, businesses, and volunteer organizations to reduce phosphorous and other non-point source (NPS) pollutants from residential, institutional and business properties. Education, based on residential and business practices surveys, community action, and technical assistance, reduced fertilizer and other inputs in Englesby Brook, Burlington; Stevens and Ruggs Brook, St. Albans; and Mallets Bay, Colchester, Vermont.

U.S. Army Corps of Engineers

Section 542 of the Water Resources Development Act of 2000 authorized the Corps to establish a program for providing environmental assistance to non-Federal interests in the Lake Champlain Basin. The goal of the program is to provide assistance with planning, designing and implementing projects that contribute to protection and enhancement of Basin water quality, water supply, ecosystem, and other water-related issues, while preserving and enhancing the economic and social character of the com-

munities. Projects share the cost; 65% Federal, 35% non-Federal. Implementation of specific BMPs will reduce phosphorus loading into the Lake. Specific projects will be identified by the Lake Champlain Basin Program and will be outlined in the Corps' General Management Plan (GMP), each year. The GMP was completed in the spring of 2004 and identified two pilot projects, including Tyler Branch, Vermont, and Lake George Village, New York. The Tyler Branch project is a streambank stabilization design that is expected to address phosphorus loading in Missisquoi Bay. The Corps is currently coordinating a work plan with the Northwest Regional Planning Commission to determine if a Project Cooperation Agreement for design will be executed in FY 2005.

OTHER FEDERAL ACTIONS

The **U.S. Army Corps of Engineers** regulates discharges of dredged or fill material into waters, including many areas that serve as buffers to prevent runoff from flushing phosphorus into Lake Champlain and its tributaries. The EPA and U.S. Fish and Wildlife Service (USFWS) also provide reviews under this process.

The **U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program** results in substantial conservation of wetland and riparian functions, including filtering and sediment retention that reduce phosphorus inputs to Lake Champlain tributaries.

The **Natural Resources Conservation Service** technical staff continue to work with an interagency team to assist the LCBP research specialist in developing coefficients to track phosphorus reductions. The estimates derived from the coefficients will allow resource planners to determine success in meeting phosphorus reduction goals.

Preventing Pollution from Toxic Substances

Reduce toxic contamination to protect public health and the Lake Champlain ecosystem.

KEY FEDERAL ACTIONS

Environmental Protection Agency

EPA provides funding for the Superfund program at the Pine Street Barge Canal and the Plattsburgh Air Force Base (AFB), Brownfield grants, and Resource Conservation and Recovery Act (RCRA) grants and enforcement. The Agency is also involved in the lease process involving the interim and long-term use of the entire Plattsburgh AFB acreage. Additionally, EPA is proposing to list the Commerce Street Plume site in Williston, Vermont, as a Superfund site. If finalized, this addition to the National Priority List under Superfund will allow for eventual cleanup of the site.

TOM MANLEY

NOAA has supported research on the Lake hydrodynamics by Middlebury College Professor, Tom Manley (far right).

U.S. Fish and Wildlife Service

Environmental contaminants specialists in the Service's Division of Environmental Quality review environmental documents, legislation, regulations, and permits and licenses with pollution potential to ensure that harmful effects on fish, wildlife, and plants are avoided or minimized. These specialists work in the field on Superfund activities, natural resource damage assessments, dredging and disposal of contaminated sediments, special contaminant studies both on and off Service lands, and oil and chemical spill response.

U.S. Geological Survey

The USGS is conducting a five-year (2001-2005) study to develop understanding of mercury (Hg) and methyl-mercury (MeHg) movement in the Lake Champlain Basin. Little is known about how mercury moves from its deposition in the terrestrial environment to its ultimate uptake by fish. Knowledge of factors controlling mercury movement in ecosystems will help identify better management practices to mitigate mercury contamination in surface waters and fish. The study is investigating the dynamics of Hg and MeHg concentrations with space and time in inlet streams and the Lake, and is deriving relations between those concentrations and various factors such as watershed hydrology and land use. Total funding for the project is estimated at $725,000. FY 2004 funding is $170,000.

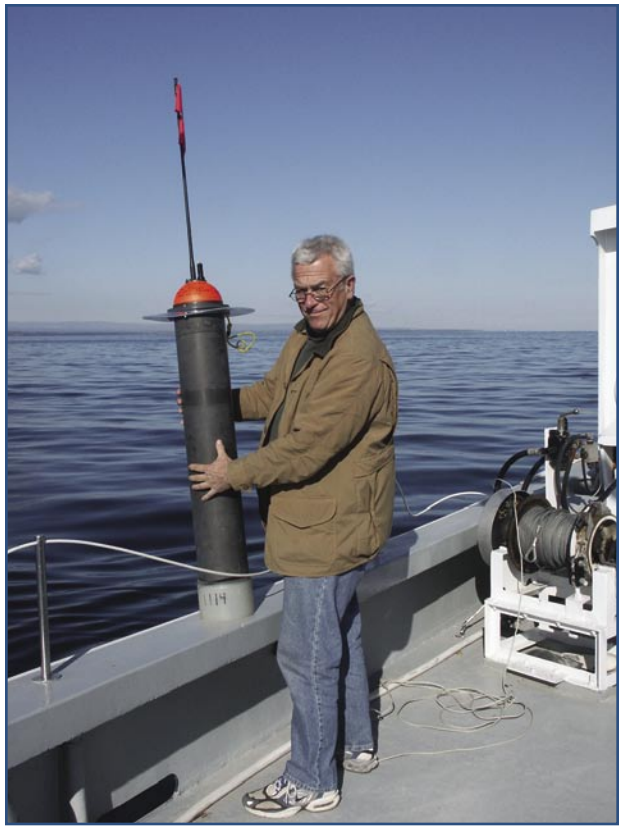
National Oceanic and Atmospheric Administration

Through the Lake Champlain Research Consortium, NOAA provides approximately $200,000 annually for atmospheric and hydrodynamic research in the Lake Champlain Basin. Approximately $100,000 supported the work of Tom Manley of Middlebury College, who continued the ongoing underwater drifters program with a number of collaborators from New York, Massachusetts, and France. Remaining resources support atmospheric and hydrodynamic research initiatives, upkeep of the Colchester Reef meteorological station, and an ongoing study of mercury transport.

The Lake Champlain Sea Grant research initiative provides urban watershed pollution prevention, reduction and education activities to assist residents, local officials, businesses and volunteer organizations to reduce toxic non-point-source pollutants from residential, institutional and business properties. Education and technical support reduces pesticide, oil/grease and household chemical inputs in urban watersheds, including Englesby Brook, Burlington; Stevens and Ruggs Brook, St. Albans; and Mallets Bay, Colchester.

The NOAA Air Resources Laboratory and Lake Champlain Sea Grant supported the development of a unified atmospheric deposition research and monitoring plan for the Lake Champlain watershed, including budgets, research priorities, an extension plan and a framework for interagency collaboration. These recommendations guide NOAA and other Federal deposition research and monitoring investments in the basin, especially in relation to mercury and airborne toxins.

UVM



Captain Dick Furbush, of the University of Vermont (UVM) research boat, Melosira, holds a drifter used for hydrodynamic research on the Lake.

Protecting Human Health

Minimize the risks to humans from water-related health hazards in the Lake Champlain Basin.

KEY FEDERAL ACTIONS

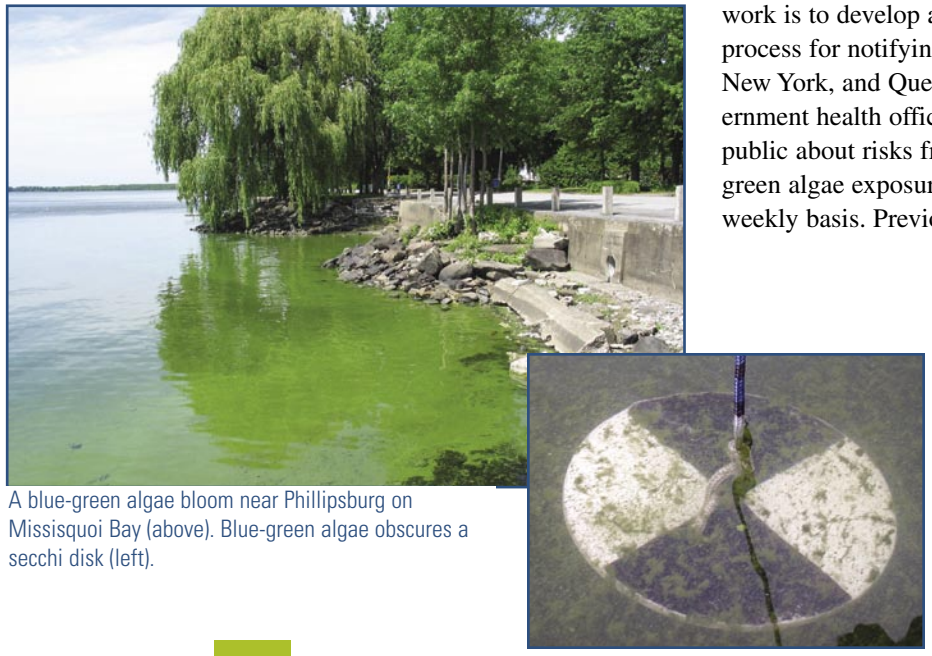
Environmental Protection Agency

EPA provides funding for the Drinking Water State Revolving Fund and funding for the implementation of the Source Water Assessment Program in the states.

Through the Lake Champlain Basin Program, EPA is funding blue-green algae research in Lake Champlain, which is being conducted by faculty at the University of Vermont. Monitoring in Lake Champlain has completed five successful field seasons so far. A vital component of this work is to develop a consistent process for notifying Vermont, New York, and Quebec government health offices and the public about risks from blue-green algae exposure on a weekly basis. Previously, some of the parties have initiated beach closures for shared waters without the knowledge of the other parties. A new project will study the possible impact herbicides have on increasing the concentration of blue-green algae in Lake Champlain.

The EPA has funded another important ongoing human health study through the Lake Champlain Basin Program. The Agricultural Pathogen Control Project attempts to evaluate innovative, low-cost methods of reducing waterborne pathogens, particularly using a multiple-barrier approach.

USFWS



A blue-green algae bloom near Phillipsburg on Missisquoi Bay (above). Blue-green algae obscures a secchi disk (left).

OTHER FEDERAL ACTIONS

Missisquoi National Wildlife Refuge is participating in an effort spearheaded by the Lake Champlain Committee, in concert with the University of Vermont, to learn more about the timing, duration, extent, and threat to humans and their pets from blue-green algal blooms in the Missisquoi Bay area.

National Oceanic and Atmospheric Administration and the Lake Champlain Sea Grant urban watershed pollution prevention, reduction and education activities specifically focus on reducing bacterial pollution of urban waterways by pet waste, and through malfunctioning septic systems.

Managing Fish and Wildlife

Restore and maintain a healthy and diverse community of fish and wildlife for the people of the Lake Champlain Basin.

KEY FEDERAL ACTIONS

U.S. Fish and Wildlife Service

The Service has several programs in the Lake Champlain Basin working directly on fish and wildlife management and restoration, including fish hatchery production. The Pittsford National Fish Hatchery raises approximately 170,000 landlocked Atlantic salmon annually for Lake Champlain and its tributaries. In addition to its hatchery production, the Service is instrumental in cooperative efforts to provide passage beyond dams for migratory fish, control parasitic sea lamprey, and monitor predatory and forage fish populations to support a multi-million dollar recreational fishery and the restoration of native species in the Lake Champlain Basin.

The 6,642-acre Missisquoi National Wildlife Refuge, located on the eastern shore of Lake Champlain near the Canadian border, provides habitat for a multitude of migratory birds and other wildlife. The Refuge is active in efforts to restore populations of declining and state-listed threatened or endangered species in the watershed. Efforts to restore species such as ospreys, black terns, eastern spiny soft shell turtles, and others have been underway for many years and will continue. Missisquoi is well known for hosting one of the largest great blue heron nesting colonies in the Lake Champlain Basin. It annually provides crucial resting and feeding habitat for tens of thousands of ducks and geese during fall migrations. Additionally, Missisquoi Refuge is participating in a research program to determine the cause and remedy for the widespread deformed frog situation.

In other places, the Lake Champlain Office's Partners for Fish and Wildlife Program completed 37 projects that restored and protected 21.2 miles of riparian, 0.8 miles of in-stream, 522 acres of wetland, and 203 acres of upland habitats in 2003. In 2004, the Program completed 30 projects that restored or enhanced 11.6 miles of riparian habitat, 1.0 mile of in-stream habitat, 262 acres of wetland habitat, and 72 acres of upland forest habitat in Vermont and the Lake Champlain watershed of New York. The Service also restored 228 acres of habitat impacted by purple loosestrife and water chestnut.

U.S. FISH AND WILDLIFE SERVICE

U.S. Fish and Wildlife Service biologists examine sea lamprey scars on a landlocked Atlantic salmon netted from the Winooski River.

National Oceanic and Atmospheric Administration

Through the Lake Champlain Sea Grant research initiative, NOAA supports research on fisheries and wildlife in the basin. The current research initiative ($350,000 for 2004-2005) includes research on downstream effects of lampricides and population studies of lamprey and cormorants to develop better management options.

U.S. Geological Survey

The Vermont Cooperative Fish and Wildlife Research Unit supports a variety of research in the Lake Champlain basin that provides important information for managing fish and wildlife.

USFWS

Missisquoi National Wildlife Refuge hosts one of the largest great blue heron nesting colonies in the Lake Champlain Basin.

Recent examples include the following studies: *Diet, movement, and dispersal patterns of Double-crested Cormorants (2001-2005); Landscape effects on population dynamics in birds (2001-2004); Management practices for grassland birds in forage crops (2001-2005); Population Dynamics of the Indiana Bat in the Champlain Valley (2003-2005); and Using radio-tagged sea lampreys to investigate potential alternative control methods (2004-2006).*

OTHER FEDERAL ACTIONS

Lake Champlain Sea Grant is a partner in the *Great Lakes Fisheries Leadership Curriculum and Institute* initiatives, which are regional extension efforts to provide local leaders with an understanding of opportunities for increasing public understanding and participation in the management of Great Lakes and Lake Champlain fisheries.

The **Environmental Protection Agency** is involved in National Environmental Policy Act (NEPA) reviews to ensure minimum impact on the environment from construction, logging, highway, and other projects.

Protecting and Restoring Wetlands, Streams and Riparian Habitats

Protect, conserve and restore Lake Champlain Basin wetlands, streams and riparian habitats and the functions and values they provide.

KEY FEDERAL ACTIONS

Natural Resources Conservation Service

The Wildlife Habitat Incentives Program (WHIP) provides financial and technical assistance to landowners to assist them in improving or enhancing wildlife habitat. NRCS obligated over $234,400 of program funds for projects on 1,400 acres in the Lake Champlain Basin, including 7 riparian/stream restoration projects, two wetland projects in partnership with the Nature Conservancy, and a wetland restoration project in partnership with Vermont Department of Forest and Parks and three towns. WHIP projects with the Vermont Chapter of The Nature Conservancy include Habitat Management for the State Endangered Timber Rattlesnake as well as invasive species control within a lakeside floodplain forest and valley clayplain forest. In 2004, the U.S. Fish and Wildlife Service, Natural Resources Conservation Service and the Town of Plainfield cooperated in providing fish passage to open up 7.5 miles of tributary on the Winooski River. The project will provide cold-water access for trout leaving the warmer Winooski River during stressful times in the summer.

In FY 2004, $165,000 of Wetland Reserve Program (WRP) funds were allotted to Vermont. Some $91,000 in funding was utilized for a Nature Conservancy restoration agreement on the Hubbardton River in West Haven, Vermont; $55,000 was used for a permanent easement (Polli's); and $19,000 went towards the Pomainville Project, the largest WRP project (425 acres) in the State. Previously, under the WRP, NRCS established an easement to restore a 385-acre wetland in Rutland County. NRCS also obligated $252,695 for a WRP easement and proposed restoration of a 425-acre wetland, which will be purchased by the State of Vermont.

NRCS in New York completed two stream stabilization projects in Clinton County on the Chazy River, including concrete block bank stabilization, bioengineering, and a riparian buffer, that provides a minimum of 35 feet of buffer. The farmer has also agreed to permanently seed the field to trap sediment and reduce further erosion.

BOB SYLVESTER/NRCS

A riparian forest buffer funded through the Natural Resources Conservation Service's CREP program.

U.S. Fish and Wildlife Service

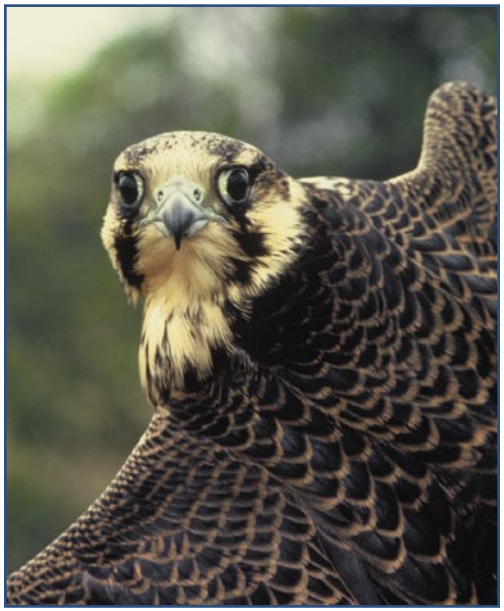
The 6,642-acre Missisquoi National Wildlife Refuge, located on the eastern shore of Lake Champlain near the Canadian border, provides habitat for a multitude of migratory birds and other wildlife. In other places, the Lake Champlain Office's Partners for Fish and Wildlife Program completed 30 projects in 2004 that restored or enhanced 11.6 miles of riparian habitat, 1.0 mile of in-stream habitat, 262 acres of wetland habitat, and 72 acres of upland forest habitat in Vermont and the Lake Champlain watershed of New York.

NRCS and the USFWS provide technical assistance to producers in the Conservation Reserve and Enhancement Program (CREP), which has resulted in 154 acres of filter strips and riparian forest buffers. CREP provided funding for tree-planting services for buffers, and Conservation Districts have developed a plant materials sales program to address the demand.

Environmental Protection Agency

The Agency is involved through the Five Star Restoration Program, which provides financial assistance on a competitive basis to support community-based wetland, riparian, and coastal habitat restoration, Section 104(b)(3) wetlands grants, and the Section 10 and Section 404 review process. With EPA funds, the Lake Champlain Basin Program supported the Vermont Riparian Project designed to establish a native tree nursery for low-cost riparian plantings. EPA nonpoint source program funds (Section 319 funds) are also being used for riparian restoration in the Lake Champlain Basin.

U.S. FISH AND WILDLIFE SERVICE



National Fish and Wildlife Foundation funding will be used to protect peregrine falcon nesting habitat.

OTHER FEDERAL ACTIONS

Implementation of specific cost-shared projects by the **U.S. Army Corps of Engineers** under Section 542 of the Water Resources Development Act of 2000, such as wetlands creation/restoration and streambank protection/restoration will protect and enhance habitats. The Corps also regulates the discharges of dredged or fill material into waters, including many streams and wetlands. The EPA and the USFWS also provide reviews under this process.

The **U.S. Fish and Wildlife Service's National Wetland Inventory** program recently completed updates of wetland maps associated with 59 U.S. Geological Survey topographic quad maps in the Basin. The maps are posted on the web and can be downloaded at: http://wetlands.fws.gov.

The **National Oceanic and Atmospheric Administration**, through **Lake Champlain Sea Grant,** provides stormwater education that focuses on preventing and reducing non-point source pollution of Vermont watersheds and involves toxic substances, bacterial contaminants, phosphorous, organic materials and sediment pollution. National Oceanic and Atmospheric Administration Sea Grant is active in a number of programs that increase public awareness of stormwater issues, such as the Chittenden County Regional Storm Water Education Program, Smart Growth education, and northern Lake Champlain shore land erosion protection.

The **National Fish and Wildlife Foundation** provided a $10,000 grant to restore about 30 acres of riparian floodplain forest by planting native trees and protecting 3,200 ft of the Missisquoi River shoreline in Enosburg, Vermont, and provided $75,000 in support of the Vermont Land Trust's project to protect a 405-acre parcel of land encompassing Preston Pond and a part of Resin Ridge in the Lake Champlain watershed. This project will protect important wildlife habitat, including peregrine falcon nesting habitat.

The **Natural Resources Conservation Service** assisted the Town of Williston with a plan that identifies erosion on Allen Brook and recommended stabilization measures. In Chazy, New York, NRCS provided technical assistance on an 80-acre wetland restoration project. In Whitehall, an 18.8-acre riparian forest buffer was installed on a dairy farm along Mud Creek, and rock riprap and 800 feet of herbaceous stream buffer was installed along the Mettawee River.

Managing Nonnative Aquatic Nuisance Plants and Animals

Control the introduction, spread and impacts of nonnative aquatic nuisance species in order to preserve the integrity of the Lake Champlain ecosystem.

KEY FEDERAL ACTIONS

Environmental Protection Agency

EPA provides funding for the Lake Champlain Water Chestnut Management Program through the Lake Champlain Basin Program along with the U.S. Army Corps of Engineers, Vermont Department of Environmental Conservation (DEC), New York State Department of Environmental Conservation, U.S. Fish and Wildlife Service, and local partners, like the Nature Conservancy.

EPA has also supported exploring non-chemical alternatives to sea lamprey control. Projects have included research on the development of a sea lamprey life history model, which will help quantify the levels of control needed on specific streams, and hydrologic modeling and site analysis for a sea lamprey barrier in Quebec.

As part of the Lake Champlain long-term monitoring program, EPA also provides funding for monitoring the zebra mussel population throughout Lake Champlain and several inland lakes in the Basin. Two small grants through the Lake Champlain Basin Program have been targeted towards controlling Eurasian watermilfoil, one in Vermont and one in New York. EPA is also involved in the NEPA review process, which provides an opportunity for screening Federal environmental projects that might contribute to the aquatic nuisance species problem. These reviews, conducted in EPA's regional offices, now include an explicit consideration of the proposed action with regard to invasive species. EPA also supports other invasive species control efforts both regionally and nationally.

U.S. Fish and Wildlife Service

The Non-indigenous Aquatic Nuisance Prevention and Control Act authorizes Service expenditures for implementing Aquatic Nuisance Species (ANS) management plans. In 2003 and 2004, the Service allocated $100,000 and $65,000, respectively, to support an aquatic nuisance species coordinator and water chestnut control activities as part of the Lake Champlain Basin Program's implementation of the ANS plan. Cooperating with a variety of governmental agencies, non-governmental organizations, and landowners, the Service has also participated in purple loosestrife control using beetles (*Galerucella* spp.) that feed on infestations, and removing water chestnut from Lake Champlain wetlands. Missisquoi Refuge and lower Missisquoi Bay were also intensively surveyed for water chestnut in 2003 and 2004.

VERMONT DEC

Lake Champlain's water chestnut problem is addressed through the cooperation of Federal, state, and local partners.

U.S. Fish and Wildlife Service and Department of State

As part of the Lake Champlain Fish and Wildlife Management Cooperative, the USFWS participates in a multifaceted approach to controlling sea lamprey populations in Lake Champlain by installing barriers to spawning migrations, trapping migrating adults, and applying target-specific pesticides, known as lampricides.

Sea lamprey control is an integral component of the USFWS's commitment toward restoring landlocked Atlantic salmon and other native species to the Lake Champlain Basin. The control program also receives significant support through the Department of State-funded Great Lakes Fishery Commission. The $4 million program for sea lamprey control in Lake Champlain is key to protecting a recreational fishery that contributes over $200 million in annual expenditures to the local economy.

SEA GRANT

Several Federal agencies are working to control impacts from sea lamprey on the Lake's native fish.

National Oceanic and Atmospheric Administration

Lake Champlain Sea Grant is extensively involved in management and control of aquatic nuisance species, including public awareness and stakeholder training (e.g. training for bait dealers to identify invasive fish in bait stocks, business feasibility studies to produce bait fish locally and avoid introduction of non-native species). The Champlain Canal Barrier Feasibility Project is completing an economic analysis of past, current, and future impacts of ANS on Lake Champlain. This will complete an assessment of the feasibility of implementing canal barriers to prevent the spread of non-native species to Lake Champlain and serve to guide future investment in this area. Through its research initiatives, Lake Champlain Sea Grant supports nuisance species research, including an innovative approach to water chestnut control, to better understand how the Lake's various sea lamprey nursery areas contribute juvenile lampreys to the adult population, and to contribute to regional efforts to manage cormorant populations and their impacts. Sea Grant extension efforts include active projects in water chestnut control, and the distribution of educational materials to boaters, anglers and the general public about practical approaches to prevent the spread of aquatic nuisance species.

U.S. Army Corps of Engineers

Implementation of specific cost-shared projects by the Army Corps of Engineers under Section 542 of the Water Resources Development Act (WRDA) of 2000, may include specific invasive species removal projects to help manage the non-native nuisance plants, while replanting native species where appropriate to help restore the affected area.

Aquatic Plant Control Program – Authorized by Section 104, River and Harbor Act of 1958, as amended. The Corps of Engineers, in cooperation with other Federal and non-Federal agencies, participates in a comprehensive program for the control of invasive aquatic plants, including water chestnut and Eurasian watermilfoil, which have adverse effects on navigation, flood control, drainage, agriculture, public health and fish and wildlife conservation. If appropriated, FY 2005 funds will be used to execute the annual agreement and continue the program with the State of Vermont on Lake Champlain.

Sea Lamprey Barriers Study – Authorized by Section 1135, WRDA 1986, as amended. Tthe Corps initiated, in cooperation with the USFWS, the Lake Champlain Basin Program, and the States of New York and Vermont, a Preliminary Restoration Plan in September 2004. If warranted, a feasibility study will be initiated to analyze potential restoration alternatives focused on sea lamprey barriers (pending the receipt of Federal funds).

Managing Recreation Resources

Manage Lake Champlain, its shorelines and its tributaries for a diversity of recreational uses, while protecting its natural and cultural resources.

KEY FEDERAL ACTIONS

National Park Service

Through multi-year technical assistance programs and various grants, the National Park Service (NPS) has supported planning and implementing of recreational projects such as an American Disability Act (ADA) approved trail at Mount Independence, the Paddlers' Trail, and the Lake Champlain Bikeways trail system, which includes signage and thematic loops. The NPS serves on the Cultural Heritage and Recreation Advisory Committee, providing program assistance and coordination.

U.S. Fish and Wildlife Service

With facilities at Pittsford National Fish Hatchery and staff outreach from the other programs in the Lake Champlain Basin, the Service is supporting a major recreational fishery in the Lake Champlain Basin, which generates over $200 million dollars for the local economy. The Missisquoi National Wildlife Refuge annually provides environmental education and recreation opportunities to thousands of visitors. Uses include waterfowl, upland game and big game hunting; fishing, trapping, wildlife observation, photography, canoeing and kayaking; and the use of walking trails through lakeside habitats. Guided walks and boat rides address the refuge's protection and management missions, as well as natural and cultural history.

U.S. Geological Survey

The USGS operates a network of 37 streamflow, lake, and reservoir gaging stations in the Lake Champlain Basin that transmit near real-time data via satellite to its computer Web site http://vt.water.usgs.gov. Data are updated at intervals of four hours or less. This information supports enhanced recreational use of the Lake and tributary streams and reservoirs by providing data to boaters, canoers, kayakers, fishermen and others to plan safe outings and match the conditions of the water to their own abilities or skill levels.

GARY RANDORF

Cyclists cruise along the Champlain Bikeway in Essex County, New York.

Environmental Protection Agency

EPA funds allowed the Lake Champlain Basin Program to help facilitate the creation of a reciprocal fishing license agreement between Vermont and New York, which allows anglers from either state to fish on both sides of most of Lake Champlain without buying an additional license. Other Lake Champlain Basin Program grants supported the development of a bilingual boating publication, information about non-motorized tourism in the region, and expansion of the underwater park system.

OTHER FEDERAL ACTIONS

The **National Oceanic and Atmospheric Administration** (Sea Grant), through its aquatic resources and coastal communities programs including Clean Marina, Clean Boating and recreational fisheries extension activities, supports the sustainable management of the coastal and aquatic recreational resources. Sea Grant Fisheries Leadership activities strengthened local angler understanding of fisheries management and how they could more effectively participate in the management of this economically important resource.

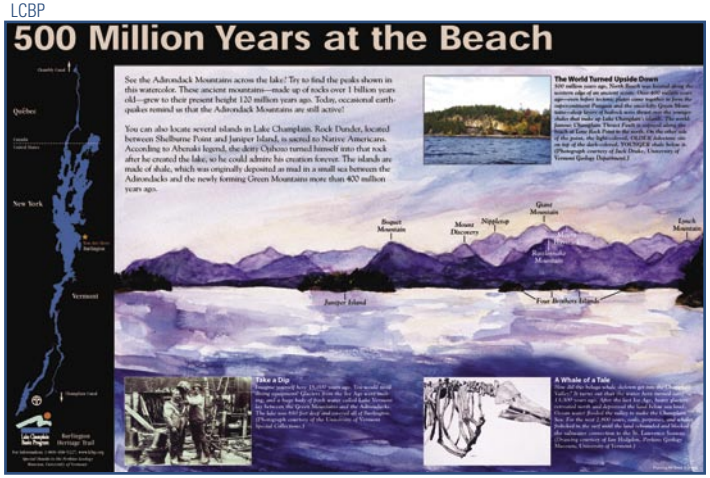
Protecting Cultural Heritage Resources

Identify, preserve, enhance and protect the irreplaceable cultural heritage resources of the Champlain Basin for the public benefit, now and for generations to come, and promote an appreciation of their value as a vital aspect of the Basin's economic and community life.

KEY FEDERAL ACTIONS

Environmental Protection Agency

LCBP



This wayside exhibit, located in Burlington, interprets the cultural and natural history of the Basin.

The EPA, through the Lake Champlain Basin Program, has funded an underwater survey of Lake Champlain since 1996 by the Lake Champlain Maritime Museum. More than 300 square miles of lake bottom have been surveyed, and more than 60 new shipwrecks have been located and documented. These new cultural resources and the many previously-known shipwrecks give Lake Champlain the most extraordinary archaeological collection of historic wooden ships in North America. The survey has also raised public awareness about the significant history of Lake Champlain and the threat that zebra mussels hold for these irreplaceable resources.

U.S. Coast Guard

To cap off the $6 million Corps of Engineers rehabilitation of the 19th century breakwater, Senator Leahy obtained a $250,000 Coast Guard appropriation to install historically accurate light towers with state-of-the-art lighting technology in the harbor. The light towers help tell the story of Burlington's commercial maritime heritage, and provide another attraction for residents and visitors to the waterfront.

National Park Service

The Service facilitated an inventory of cultural resources in the Basin, which culminated in the *Champlain Valley Heritage Corridor* report. The Service also provided Lake Champlain Basin Program funding and assistance for Historic Landings signage, underwater mapping, survey and preserves development, the Unknown Treasures project, and supported the Cultural Heritage and Recreation Coordinator position. The NPS serves on the Cultural Heritage and Recreation Advisory Committee, providing program assistance and coordination.

National Park Service and EPA funds have supported the Lake Champlain Basin Program's Wayside Exhibit. The LCBP has provided design services for 100 wayside exhibits for communities and organizations in New York, Vermont, and Quebec, using the template developed for signage in the Champlain Valley. Wayside exhibits are excellent tools for interpreting the environmental, cultural, natural and/or historical significance of a site. This interpretation leads to better public understanding and stewardship of the Basin's resources.

Natural Resources Conservation Service

As part of providing planning and application assistance, NRCS conducts archeological investigations on all land-disturbing practices to comply with the National Historic Preservation Act. In 2004, the review of over 250 ground-disturbing conservation practices in the Champlain Basin resulted in four newly discovered archeological sites and twelve sites that were recorded on the Vermont Archeological Inventory. Fifteen sites are Native American short-term encampments from the pre-contact period and one site is a 19th century industrial site (sawmill) on the New Haven River. None of the conservation activities planned or implemented by NRCS disturbed any of the cultural resources encountered. Two conservation projects were redesigned to avoid disturbing archeological sites.

Department of Defense

The Lake Champlain Maritime Museum (LCMM) received support from the Department of Defense (DOD) Legacy Resource Management Program in 1995, 1998, and 2000-2003. Working through the Naval Historical Center, LCMM manages the Federally owned properties on the lake bottom, such as military related shipwrecks and artifacts. The centerpiece of LCMM's research is Benedict Arnold's Gunboat *Spitfire*, lost on October 12, 1776, during the American retreat from the Battle of Valcour Island. On behalf of the Navy, LCMM monitors the site to ensure that ill-intentioned divers do not damage it, conducts a yearly inspection of the vessel, and is completing a management plan for the boat. DOD Legacy funding also supports the Valcour Bay Research Project. This is an underwater archaeological survey, undertaken since 1999, to study Revolutionary War battlefield scatter and preserve sites from artifact collectors by fostering site stewardship with local recreational divers.

OTHER FEDERAL ACTIONS

The **U.S. Fish and Wildlife Service** cooperates with local Native Americans, Universities, and state and Federal cultural resource agencies to protect and interpret archaeological resources at Missisquoi National Wildlife Refuge, which is culturally one of the most significant sites in Vermont.

In 2001 and 2003, the LCMM received funding from the American Battlefield Protection Program (ABPP) of the **National Park Service** in support of the Valcour Bay Research Project. In the 2003 grant, the ABPP has also asked LCMM to inventory the privately held collections of artifacts taken from Valcour Bay over the past several decades.

The **Environmental Protection Agency**, through the Lake Champlain Basin Program, funded the design and printing of the *Vermont Cultural Heritage Tourism Toolkit* in 2003. The Toolkit furnishes parties interested in cultural heritage tourism with the information they need to develop cultural heritage tourism "products" that are authentic, engaging, and sustainable.

LAKE CHAMPLAIN MARITIME MUSEUM

Artist Ernie Haas' depiction of the gunboat *Spitfire* on the bottom of Lake Champlain.

Informing and Involving the Public

Promote a better understanding and appreciation of the Lake Champlain Basin and its resources in order to encourage greater public participation, individual responsibility and action for protecting these resources.

KEY FEDERAL ACTIONS

Environmental Protection Agency

The Lake Champlain Basin Program, through EPA funding, taught more than 1,300 New York and Vermont students about Lake Champlain during 2003, and developed and distributed 8,000 copies of the *Your Lake, Your Lawn* brochure in conjunction with the Greater Burlington Industrial Council and the Lake Champlain Chamber of Commerce.

ECHO

More than 100,000 guests have visited ECHO, since it opened in May 2003.

The LCBP also provided $10,000 to the Vermont Department of Fish and Wildlife to develop an identification guide for native and non-native aquatic nuisance fish species. An additional 48 television news stories and two half-hour specials about the Lake Champlain watershed were developed for the *Champlain 2000* weekly broadcast on WPTZ NewsChannel 5. Five new exhibits about Lake Champlain were installed at the Champlain Centres North Mall in Plattsburgh, New York, to increase citizen awareness about Lake issues.

Environmental Protection Agency, U.S. Department of Housing and Urban Development, and the Institute for Museum and Library Services

Federal funding was a major part of the total package that allowed the development of ECHO at the Leahy Center for Lake Champlain, as well as the Rubenstein Ecosystem Science Laboratory. ECHO is Lake Champlain's premier lake aquarium and science center, which educates and delights guests of all ages about the ecology, culture, history, and opportunity for stewardship of the Lake Champlain Basin. Encompassing almost 30,000 square feet, ECHO features twenty aquatic habitats with more than 60 animal species, and 100 hands-on interactive exhibits. Visitors go nose-to-nose with live fish, amphibians and reptiles and experience a multimedia theater, all surrounded by beautiful views of Lake Champlain and the Adirondack Mountains. The Lake Champlain Basin Program, funded through the EPA, operates and staffs a Resource Room within ECHO that provides in-depth information on lake issues, research, stewardship, and educational curricula for the public. More than 10,000 visitors were assisted by Resource Room staff alone during ECHO's first 4 months of operation.

U.S. Fish and Wildlife Service

On September 13, 2003, the Service held a groundbreaking ceremony to celebrate the construction of a new headquarters and visitor facility at the Missisquoi National Wildlife Refuge. The new 7,250 square-foot facility will include a lobby and reception area,

exhibit area, and multi-purpose room for environmental education, public meetings or presentations, and community events. With additional facilities at Pittsford National Fish Hatchery and staff outreach from the other Service programs in the Lake Champlain Basin, the Service is supporting enhanced understanding of the Basin's resource management problems to allow informed choices on its long-term protection and restoration.

National Oceanic and Atmospheric Administration

The Lake Champlain Sea Grant provides science-based information to the public, resource users and stakeholders, and decision makers to increase their awareness of key coastal and aquatic resource issues and to help them make informed choices among difficult resource management decisions. Sea Grant informs the public about water quality, watershed stewardship, nuisance aquatic species, fisheries and other Basin issues through contributed articles to local newspapers, radio and TV interviews, and videos on public access television. Sea Grant sponsors *Across the Fence* television productions that inform the public about community led actions in water quality and watershed protection.

Natural Resources Conservation Service

Adirondack Waterfest 2003 attracted about 500 people to the shores of Lake Champlain at Plattsburgh Landing in New York. This annual educational event educates the public about the importance of water resources. The effort was coordinated by the Greater Adirondack RC&D Council, the Clinton County Soil & Water Conservation District, the NRCS (New York), and local groups. The Waterfest features educational exhibits, entertainment, children's activities, and water-related demonstrations.

National Park Service

NPS provided multi-year support of a bikeways clearing-house designed to coordinate and disseminate information about bike trails, supported public access information media, and facilitated a public information series. Through their work on the Cultural Resources and Recreation Advisory Committee, the NPS assists LCBP staff in disseminating information about trails, programs and events to a broad constituent base.

U.S. Geological Survey

In 2004, the USGS relocated its Lake Champlain gaging station in Burlington, which has operated continuously since 1907, to the ECHO Leahy Center for Lake Champlain. The gaging station is located on the Center's dock and includes instrumentation and a display available to the public. The USGS will enter into an educational partnership to support the Center's proposed Watershed Weather Studio that informs the public about the meteorology and hydrology of the watershed and how these sciences relate to a wide variety of activities at the Federal, State, and local levels to improve the health of the Lake, protect and manage watershed resources, and support the regional economy.

OTHER FEDERAL ACTIVITIES

The **National Fish and Wildlife Foundation** provided a $3,000 grant supporting the Missisquoi National Wildlife Refuge Friends Education Initiative to increase awareness of migratory bird conservation efforts at the Refuge.

The Town of Ticonderoga replaced a deteriorating concrete slab that was used as a fishing platform for many years along the La Chute River with support from the Greater Adirondack RC&D Council, Essex County Soil & Water Conservation District, the **Natural Resources Conservation Service** (New York), and the New York State Soil & Water Conservation Committee.

Building Local-Level Implementation

Support and enhance cooperative watershed planning efforts to protect and improve water quality.

KEY FEDERAL ACTIONS

Environmental Protection Agency

Local grants are a key component of the Lake Champlain Basin Program funding from the EPA. More than $2.7 million has been granted since 1993 for local projects by towns and not-for-profits. In 2003, $178,700 was allocated. Projects include providing organizational support for local watershed groups, cleaning up streams, increasing Lake access, helping homeowners prevent pollution, and revitalizing cultural sites.

National Oceanic and Atmospheric Administration

LAKE CHAMPLAIN SEA GRANT/MARK MALCHOFF

Students learned how to identify stream macro-invertebrates (insects) through Lake Champlain Sea Grant's Watershed Alliance program.

Educating and engaging students, youth groups, and underserved youth in watershed stewardship are major activities of Lake Champlain Sea Grant through the Watershed Alliance and the Northern New England Lake Education and Action Project. With EPA support, Sea Grant, the UVM Watershed Alliance and Edmunds Middle School are developing and testing an urban watersheds and water-quality education program that complements and strengthens the existing science curriculum. Lake Champlain Sea Grant is also active in improving local government and community organizations' capacities for watershed and water-quality protection by developing tools and providing educational and technical assistance. Lake Champlain Sea Grant works in partnership with municipal officials, businesses, educators, and volunteer groups to engage the public in protecting lake and stream water quality from domestic/urban non-point source pollution in stormwater, increase public participation in basin planning, watershed and lake stewardship and stream restoration, and reduce and control erosion. In 2004, Lake Champlain Sea Grant and UVM Extension supported a new specialist in Land Use Planning and Water Quality to assist Vermont communities in identifying and reducing non-point source pollution from urban and agricultural sources.

OTHER FEDERAL ACTIONS

In 2003, the **Lake Champlain Basin Program** and the Citizens Advisory Committees held four public meetings in New York and Vermont that were attended by 200 citizens. These meetings provided important public input on Lake Champlain issues, and the plan, *Opportunities for Action*.

Section 542 of the Water Resources Development Act of 2000 allows the **U.S. Army Corps of Engineers** to assist with planning, designing and implementing local projects.

Through its Partners for Fish and Wildlife program, the **U.S. Fish and Wildlife Service** is a key funding partner in many watershed planning efforts in the Lake Champlain Basin.

The **Natural Resources Conservation Service** works with and through Conservation Districts and local work groups, as well as partners, to implement conservation activities. The eleven Vermont and four New York NRCS offices in the Basin provide a local-oriented conservation delivery system.

The **National Park Service** provides various grants through the Lake Champlain Basin Program, including the Technical Assistance Program, Partnership Program, and Public Access Enhancement Awards.

Document progress and achievements resulting from implementation of the Plan.

KEY FEDERAL ACTIONS

Environmental Protection Agency

For more than 13 years now, EPA funds, through the Lake Champlain Basin Program, have supported the Lake Champlain Long-term Biological and Water-Quality Monitoring conducted jointly by the States of Vermont and New York. This long-term database has been critical to tracking progress in *Opportunities for Action* and will help track implementation of the TMDL. The Lay Monitoring Program, the second oldest citizen-monitoring program in the United States, is nearly 25 years old and is conducted by the Vermont DEC. This citizen-collected data has also been vital to tracking *Opportunities for Action* both within Lake Champlain and inland lakes in its Basin. Blue-green algae monitoring, described fully in the Human Health section, is coordinated with both of these long-term monitoring efforts via the Lake Champlain Basin Program.

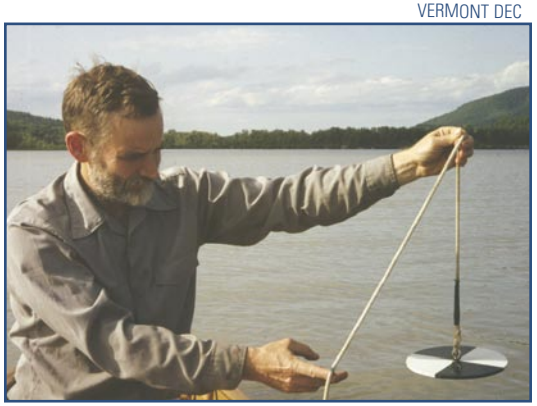
National Oceanic and Atmospheric Administration & U.S. Department of Agriculture

With support from a U.S. Department of Agriculture Water-Quality grant, Sea Grant and the UVM Watershed Alliance recently developed a web-accessible water quality database, called the Vermont Water-Quality Gateway. The Gateway will allow the public to view/download data, while a password-protected data-entry portal will allow data entry by participating educational and approved citizen monitoring groups. The Watershed Alliance is active in 15 schools in Vermont and New York. Alliance schools collect quality-controlled stream and water-quality data. These data provide important baseline conditions and allow for the tracking of any improvements or deterioration in water quality.

U.S. Fish and Wildlife Service

The Service's ongoing fisheries technical assistance program includes a variety of monitoring efforts for salmonids, forage fish and other species. In addition, migratory bird population monitoring at Missisquoi National Wildlife Refuge tracks occurrence of a variety of waterfowl and other species at the Refuge.

VERMONT DEC



A volunteer lay monitor uses a secchi disk to measure the water clarity of Lake Champlain.

Natural Resources Conservation Service

NRCS maintains a "Performance Results Measurement System" to track specific conservation accomplishments. NRCS also has collaborated with the Agency of Agriculture in tracking phosphorus reductions associated with joint cost-share efforts.

OTHER FEDERAL ACTIONS

Data from the **U.S. Geological Survey**'s network of 37 streamflow, lake, and reservoir gages in the basin provide valuable support to a wide variety of monitoring efforts. USGS's long-term (1999-2007) study of the efficacy of agricultural and urban best management practices (BMPs) in reducing phosphorus and sediment loads to Lake Champlain is described in the section on reducing phosphorous pollution.

Extension, education and research programs supported by **Lake Champlain Sea Grant** include monitoring and reporting components. Outputs, outcomes and impacts are reported annually and are available to agencies, organizations and the public.

Economics in the Lake Champlain Basin

Promote healthy and diverse economic activity and sustainable development principles within the Lake Champlain Basin while improving water quality and conserving natural and cultural heritage resources on which the regional economy is based.

THE IMPACT OF FEDERAL ACTIONS

The economic impact of Federal agency actions in the Lake Champlain Basin occurs in two ways. In addition to the direct economic impact of Federal expenditures, the regional economy benefits from improvements in information, infrastructure and the environment as a result of Federal actions.

Federal appropriations are identified for 92% of the actions listed in *Opportunities for Action.*

The total indirect economic impact of Federal activity in the Basin, while difficult to measure, clearly is substantial. For example, sea lamprey control is an integral component of the U.S. Fish and Wildlife Service's commitment toward restoring landlocked Atlantic salmon and other native species to the Lake Champlain Basin. The control program also receives significant support through the Department of State-funded Great Lakes Fishery Commission, Lake Champlain Sea Grant, Lake Champlain Basin Program and the States of New York and Vermont. Overall, the Lake Champlain sea lamprey control program contributes over $4 million directly to the regional economy, but is key to protecting a recreational fishery that contributes over $200 million annually.

Even the direct impact of Federal expenditures in the Basin is difficult to measure for several reasons. For example, no Federal agency routinely identifies its expenditures within a watershed boundary. Even if such data were readily available, expenditures to support headquarters or other outside staff that work all or part of the time on issues within the watershed aren't usually quantified on a watershed basis. Neither are Federal technical and office equipment and vehicles, which are generally used partly to support work within a watershed.

Nevertheless, the direct significance of Federal expenditures in the Lake Champlain Basin is apparent from the following statistic: 92% (83 of 90) of the actions listed in *Opportunities for Action* identify Federal appropriations among the potential funding sources.